CLAIMS

1. A method for measuring non-circularity of a core part of an optical fiber base material having the core part and a clad part, the method comprising the steps of:

immersing the optical fiber base material in liquid having a refractive index substantially equal to that of the clad part of the optical fiber base material;

irradiating parallel light from a side face of the optical fiber base material to measure intensity distribution of transmitted light;

measuring a width of a dark space caused by light passing the core part on intensity distribution to obtain a relative value for a core diameter;

rotating the optical fiber base material to further obtain the relative value for the core diameter at plural points for a circumferential direction; and

obtaining non-circularity of the core part based on the obtained plurality of relative values for the core diameter.

2. The measurement method of non-circularity of a core part of an optical fiber base material as claimed in claim 1, wherein the width of the dark space caused by light passing the core part is measured by a parallel light projection type diameter measurement device.

3. The measurement method of non-circularity of a core part of an optical fiber base material as claimed in claim 2, wherein the parallel light projection type diameter measurement device can adjust a detection threshold value.

4. The measurement method of non-circularity of a core part of an optical fiber base material as claimed in any one of claims 1 to 3, wherein the non-circularity of the core part is obtained by dividing a difference between a maximum value and a minimum value for the relative values for the core diameter measured from the plurality of circumferential directions by a mean value for the relative values for the core diameter.

5. The measurement method of non-circularity of a core part of an optical fiber base material as claimed in any one of claims 1 to 3, wherein the relative value $D_c(\varphi)$ for the core diameter measured from the plurality of circumferential directions is fitted to $D_c(\varphi)=A+B\sin 2\varphi$, and the non-circularity of the core part is set to 2B/A.

6. The measurement method of non-circularity of a core part of an optical fiber base material as claimed in claim 5, wherein the fitting uses Fourier analysis or high-speed Fourier analysis.

7. The measurement method of non-circularity of a core part of an optical fiber base material as claimed in any one of claims 1 to 6, wherein the measurement of non-circularity of the core part is performed by vertically arranging the optical fiber base material.

8. The measurement method of non-circularity of a core part of an optical fiber base material as claimed in any one of claims 1 to 7, wherein a portion of a vessel accommodating liquid, which is passed through by parallel light and the transmitted light at least irradiated on the optical fiber base material, consists of a material having a refractive index substantially equal to that of the clad part.

9. The measurement method of non-circularity of a core part of an optical fiber base material as claimed in any one of claims 1 to 8, wherein a portion of a vessel accommodating liquid, which is passed through by parallel light and the transmitted light at least irradiated on the optical fiber base material, consists of a material equal to that of the clad part.

10. The measurement method of non-circularity of a core part of an optical fiber base material as claimed in any one of claims 1 to 9, wherein the vessel accommodating liquid has a parallel outer surface opposite to a portion passed through by parallel light and the transmitted light at least irradiated on the optical fiber base material, and a cylindrical hole is provided in a center of the vessel.

11. The measurement method of non-circularity of a core part of an optical fiber base material as claimed in claim 10, wherein the parallel outer surface and an inner surface of cylindrical hole facing each other are polished.

12. The measurement method of non-circularity of a core part of an optical fiber base material as claimed in any one of claims 1 to 11, wherein the liquid in the vessel is regulated to constant temperature.

13. The measurement method of non-circularity of a core part of an optical fiber base material as claimed in any one of claims 1 to 12, wherein temperature of an atmosphere in which a core non-circularity measuring apparatus is provided is substantially constantly regulated.

14. An apparatus for measuring non-circularity of a core part of an optical fiber base material having the core part and a clad part, the apparatus comprising:

means for immersing the optical fiber base material in liquid having a refractive index substantially equal to that of the clad part of the optical fiber base material;

means for irradiating parallel light toward a side face of the optical fiber base material immersed in the liquid;

means for measuring intensity distribution of transmitted light passing through the optical fiber base material;

means for measuring a width of a dark space caused by light passing the core part on intensity distribution to obtain a relative value for a core diameter; and

means for rotating the optical fiber base material to measure relative values for the core diameter at plural points for a circumferential direction of the optical fiber base material, wherein

the non-circularity of the core part is obtained based on the plurality of relative values for the core diameter.

15. The measurement apparatus of non-circularity of a core part of an optical fiber base material as claimed in claim 14, wherein said means for obtaining a relative value for a core diameter is a parallel light projection type diameter measurement device.

16. The measurement apparatus of non-circularity of a core part of an optical fiber base material as claimed in claim 15, wherein the parallel light projection type diameter measurement device can adjust a detection threshold value.

17. The measurement apparatus of non-circularity of a core part of an optical fiber base material as claimed in any one of claims 14 to 16, further comprising means for vertically supporting the optical fiber base material.

18. The measurement apparatus of non-circularity of a core part of an optical fiber base material as claimed in any one of claims 14 to 17, wherein a portion of a vessel accommodating liquid, which is passed through by parallel light and the transmitted light at least irradiated on the optical fiber base material, consists of a material having a refractive index substantially equal to that of the clad part.

19. The measurement apparatus of non-circularity of a core part of an optical fiber base material as claimed in any one of claims 14 to 17, wherein a portion of a vessel accommodating liquid, which is passed through by parallel light and the transmitted light at least irradiated on the optical fiber base material, consists of a material equal to that of the clad part.

20. The measurement apparatus of non-circularity of a core part of an optical fiber base material as claimed in any one of claims 14 to 19, wherein the vessel accommodating liquid has a parallel outer surface opposite to a portion passed through by parallel light and the transmitted light at least irradiated on the optical fiber base material, and a cylindrical hole is provided in a center of the vessel.

21. The measurement apparatus of non-circularity of a core part of an optical fiber base material as claimed in claim 20, wherein the parallel outer surface and an inner surface of cylindrical hole facing each other are polished.

22. The measurement apparatus of non-circularity of a core part of an optical fiber base material as claimed in any one of claims 14 to 21, further comprising a preform analyzer.

23. The measurement apparatus of non-circularity of a core part of an optical fiber base material as claimed in any one of claims 14 to 22, further comprising a control and arithmetic unit for performing control and arithmetic processing for each means.